

**REMARKS**

Claims 4-6 and 8-10 are pending in this application. By this Amendment, claims 4, 6 and 8-10 are amended, and claims 1-3 and 7 are canceled without prejudice to or disclaimer of the subject matter set forth therein. Support for the amendments to claims 4, 6, and 8-10 can be found in claims 1-10 as originally filed. No new matter is added by these amendments.

**I. Claim Rejections**

**A. Wang et al.**

The Office Action rejects claims 1-3 and 8 under 35 U.S.C. §102(e), or in the alternative under 35 U.S.C. §103(a), over U.S. Patent No. 6,503,421 to Wang et al.

Claims 1-3 are canceled by this Amendment. Applicants respectfully submit that the rejection has been obviated with respect to these claims and should be withdrawn.

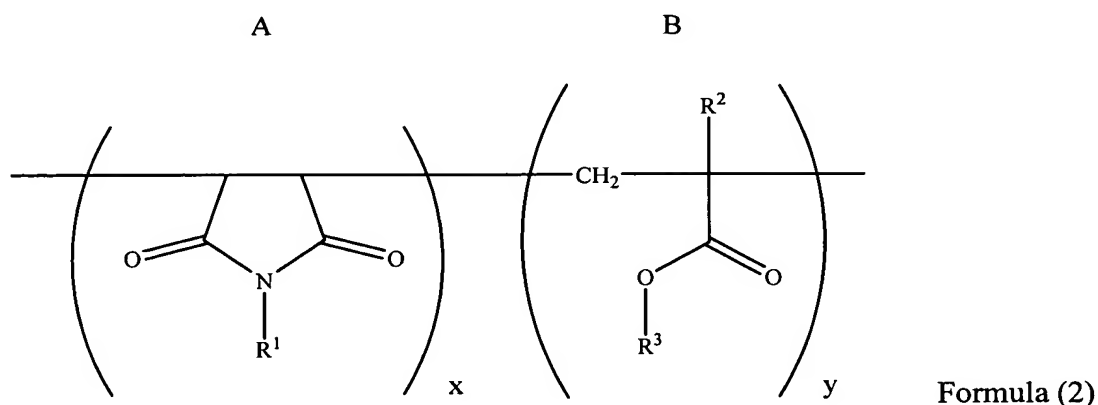
Further, amended claim 8 depends from non-rejected claim 4. Applicants respectfully submit that claim 8 is patentable over Wang for at least the same reasons as non-rejected claim 4. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**B. Padmanaban et al.**

The Office Action rejects claims 1-10 under 35 U.S.C. §103(a) over U.S. Patent No. 6,803,168 to Padmanaban et al. Claims 1-3 and 7 are canceled by this Amendment. Applicants respectfully submit that the rejection has been obviated with respect to these claims and should be withdrawn. Applicants respectfully traverse this rejection with respect to claims 4-6 and 8-10.

Independent claim 4 sets forth a “bottom anti-reflective coat forming composition for lithography processes in semiconductor device preparation, wherein the bottom anti-reflective

coat forming composition comprises resin containing a structural unit comprising maleimide or a derivative thereof, wherein the resin comprises the structural unit shown in Formula (2)

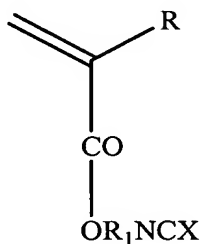


wherein each R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is independent of one another; R<sup>1</sup> is hydrogen, halogen, or substituted or unsubstituted C<sub>1</sub>-C<sub>10</sub> alkyl group; R<sup>2</sup> is hydrogen, halogen or methyl group; R<sup>3</sup> is hydrogen or substituted or unsubstituted C<sub>1</sub>-C<sub>10</sub> alkyl group; x is number 1-10300; and y is number 0-12100, and is the polymer comprising 10-100 mol% of the maleimide structural unit (A) and 90-0 mol% of the (meth)acrylate structural unit (B), based on the sum of the maleimide structural unit (A) and the (meth)acrylate structural unit (B) in the polymer, and wherein said composition further comprises crosslinking agent having at least two crosslinking forming functional groups.” Claims 5, 6, and 8-10 depend, either directly or indirectly, from claim 4, and include all of the limitations thereof.

Resins including the structural unit of Formula (2), as set forth in claim 4, provide distinct benefits to bottom anti-reflective coat forming compositions. In particular, bottom anti-reflective coat forming compositions that comprise the Formula (2) structural unit have improved dry etching rates. *See* Specification, paragraph [0016]. That is, the dry etching rates for the bottom anti-reflective coat forming composition are increased when polymers including the structural unit of Formula (2) are used. These dry etching rates are still further improved when R<sup>1</sup> is a hydrogen, halogen, or substituted or unsubstituted C<sub>1</sub>-C<sub>10</sub> alkyl group, as set forth in claim 4, rather than an aromatic group. *See* Specification, paragraph [0015].

The Office Action asserts that claims 4-6 and 8-10 would have been obvious over Padmanaban. Applicants respectfully disagree.

Padmanaban discloses anti-reflective coating compositions that can be used as bottom anti-reflective coatings. *See* Padmanaban, col. 3, lines 23-42. The Padmanaban compositions include resins formed from monomers or polymers represented by General Formula I. *See* Padmanaban, col. 4, line 28 - col. 5, line 4.



General Formula I

The monomers of General Formula I may be polymerized with comonomers including (meth)acrylates and maleimides. *See* Padmanaban, col. 4, line 28 – col. 5, line 4; col. 6, lines 38-64. In addition, Padmanaban discloses that additives, such as surfactants, plasticizers and cross-linkers, may be incorporated into the coating material to improve the film-forming properties. *See* Padmanaban, col. 11, lines 23-28.

Padmanaban discloses maleimides and (meth)acrylates as comonomers that may be polymerized with monomers of General Formula I, but these are only some of a long list of possible comonomers that may be employed. *See* Padmanaban, col. 6, line 38 – col. 7, line 12. Padmanaban does not teach or suggest any preference for maleimides and/or (meth)acrylate comonomers, and fails to provide any teachings that resins including the specific structural unit of Formula (2) have different and improved properties such as dry etching rates.

Padmanaban also teaches that cross-linking agents may be added to its coating material. *See* Padmanaban, col. 11, lines 23-28. However, these teachings are very general and do not provide any specific teachings relating to the characteristics of the cross-linking

agents. *See generally* Padmanaban. In fact, Padmanaban teaches away from including such multi-functional cross-linking agents, teaching instead that it is possible to eliminate cross-linking additives by providing copolymeric materials that contain intrinsically cross-linking functions. *See* Padmanaban, col. 3, lines 57-67. In contrast, the bottom anti-reflective coat forming compositions of claim 4 require a specific type of cross-linking agent, one that has at least two cross-linking forming functional groups. That is, the cross-linking agents of claim 4 must include at least two functional groups capable of forming cross-linkages. Padmanaban does not disclose or suggest such cross-linking agents.

For at least the reasons set forth above, Padmanaban does not teach or suggest all of the features of independent claim 4 or its dependent claims. Applicants respectfully submit that claims 4-6 and 8-10 are patentable over Padmanaban. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

## **II. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 4-6 and 8-10 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Julie M. Seaman  
Registration No. 51,156

JAO:JMS/jms

Date: February 4, 2005

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

**DEPOSIT ACCOUNT USE  
AUTHORIZATION**

Please grant any extension  
necessary for entry;  
Charge any fee due to our  
Deposit Account No. 15-0461